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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/825,108

04/16/2004

Shinji Matsumoto

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01/27/2006

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EXAMINER

CHATTERJEE, SANTANU

ART UNIT

PAPER NUMBER

3661

DATE MAILED: 01/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/825,108	MATSUMOTO ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Santanu Chatterjee	3661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 April 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 7-18 is/are rejected.
- 7) ☒ Claim(s) 4-6 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☒ Some    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>08/13/2004</u> .  | 6) <input type="checkbox"/> Other: _____                                    |

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### **DETAILED ACTION**

1. The application filed on April 16, 2004 has been examined, and the Claims 1 - 18 are pending.

#### ***Information Disclosure Statement***

2. The Information Disclosure Statements that were filed on April 16, 2004 and August 13, 2004 have been considered.

#### ***Priority***

3. Applicant's claim to foreign priority under 35 U.S.C. 119 is acknowledged. A certified copy of the Japanese language priority document i.e. Application No. JP2003-118896 filed April 23, 2003 with the Japanese Patent Office, has been received with this application.

The following is a quotation of appropriate paragraphs of 35 U.S.C. 119 and of 35 U.S.C. 365, that form the basis for the Office actions set forth under this section:

35 U.S.C. 119 (b) (3): The Director may require a certified copy of the original foreign application, specification, and drawings upon which it is based, a translation if not in the English language, and such other information as the Director considers necessary. Any such certification shall be made by the foreign intellectual property authority in which the foreign application was filed and show the date of the application and of the filing of the specification and other papers.

35 U.S.C. 365 (c): In accordance with the conditions and requirements of section 120 of this title, an international application designating the United States shall be entitled to the benefit of the filing date of a prior national application or a prior international application designating the United States, and a national application shall be entitled to the benefit of the filing date of a prior international application designating the United States. If any claim for the benefit of an earlier filing date is based on a prior international application which designated but did not originate in the United States, the Director may require the filing in the Patent and Trademark Office of a certified copy of such application together with a translation thereof into the English language, if it was filed in another language.

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4. The U.S. Application requests a claim to convention priority, but does not include a certified copy of a translation in the English language of the priority Japanese document or its equivalent. The Japanese document is in the application stage, and not published by the Japanese Patent Office, thus limiting the scope of translation possibilities. In order to obtain the convention priority date of April 23, 2003 on the U.S. application and such resulting patent, an English language translation of the priority Japanese document must be filed within the set period for reply to this Office action (see 35 U.S.C. 119(b)(3) and 35 U.S.C. 365(c)).

### ***Specification***

5. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.
6. The specification is objected to because of the following minor informalities, and appropriate corrections are suggested.
- Page 3, Lines 14-16: the sentence "...an automotive lane deviation prevention apparatus comprises ..." is repeated twice, this should be amended to one occurrence.
  - Page 4, Line 30: the sentence "... by feedback-controlling the braking ...", should be amended to "... by feedback-control of the braking ...".

- Page 5, Line 29: the sentence "... vehicle speed V versus decision ...", should be amended to "... vehicle speed v decision ...".
- Page 6, Line 7: the sentence "... vehicle speed V versus proportional ...", should be amended to "... vehicle speed v proportional ...".
- Page 10, Line 4: the sentence "... precisely certainly recognize the lane markers ...", should be amended to "... precisely recognize with certainty the lane markers ...".

***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the second paragraph of 35 U.S.C. 112 that forms the basis for the Office actions under this section:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In regard to Claim 9, the claimed "... increasingly compensating for a controlled variable for LDP control ...", is indefinite because the controlled variable is not defined, and the basis for "increasingly compensating" is not defined. The specification does not help in giving any further definite meaning to this claim.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1, 2, 8, 10 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jeon (US Pat. No.: 6,487,501; hereinafter Jeon) in view of Satoh et al. (US Pat. No.: 6,489,887; hereinafter Satoh).

In regard to Claims 1, 2 and 16, the claimed automotive lane deviation prevention apparatus is disclosed by Jeon as: " ... a system for preventing lane deviation of a vehicle and a control method thereof ... " [Column 1, lines 9 - 10].

Further, the claimed processor (in Claims 1 and 2), is disclosed by Jeon as: " ... an input data processor for processing information of various sensors ... " [Column 2, lines 28 - 29], and " ... an output data processor for outputting information ... " [Column 2, lines 41 - 42].

Further, the claimed sensor for detecting (in Claim 16), and determining if the host vehicle is traveling on predetermined irregularities close to the left or right hand side lane marking line of a driving lane (in Claims 1, 2 and 16) is disclosed by Jeon as: " ... The system comprises a detector including a lane marker detector for detecting lane markers that define a lane in a road... " [Column 2, lines 61 - 67], and that: " ... The detector [10] includes a lane marker detector [14] and a lane marker

ECU [16]. The lane marker detector [14] is realized through a magnetic sensor that detects magnetic nails installed in lane markers of the road, and the lane marker ECU determines a present transverse position of the vehicle using information received from the lane marker detector ... " [Column 4, lines 61 - 67]. The left or right hand side lane marking line is not explicitly stated by Jeon, but in an analogous art, Satoh discloses this: " ... As shown in FIG. 5, in this embodiment ten search areas including five right search areas and five left search areas are searched ... " [See Fig. 5 and Column 3, lines 33 - 36]. It would have been obvious to one of ordinary skill in the art to combine the disclosures of Jeon and Satoh.

Further, the claimed yawing motion control to return the vehicle to a central position of the driving lane when the vehicle has deviated, and is traveling on the lane line markers, is not disclosed by Jeon as yawing motion control but as steering control. However, in an analogous art the yaw motion detection and control is disclosed by Satoh as: " ... the lane-keep assisting system is installed to a vehicle and comprises, ... , a controller [3], a yaw rate sensor [4], a vehicle speed sensor [5] ... " [Column 2, lines 25 - 28], and further that: " ... At step [S12] controller [3] reads a vehicle speed  $V$  from vehicle speed sensor [5], and at step [S13] controller [3] reads an actual yaw rate  $\theta_{\text{REAL}}$  from yaw rate sensor [4]. At step [S14] controller [3] calculates a target yaw rate  $\theta_{\text{NEED}}$ , which is a yaw rate necessary for reaching the host vehicle from the lateral displacement position to the lane center, on the basis of lateral displacement  $[XL1]$ ... " [Column 5, lines 27 - 33].

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the disclosure of Jeon of a vehicle lane deviation detection system that uses predetermined lane markers, with the teachings of Satoh, to use yaw motion control to return the vehicle to the center of the driving lane.

In regard to Claim 8, the claimed detection of the lane marking line based on the picture image captured by the picture image pick-up device, is disclosed by Satoh as: " ... the lane-keep assisting system [S] is installed to a vehicle [VE] and comprises a CCD camera [1], an image processor [2], ... " [Column 2, lines 25 - 27], and further that: " ... Camera [1] takes an image of a road view ahead of vehicle [VE]. Image processor [2] is coupled to camera [1] and receives data of the image taken by camera [1]. Image processor [2] processes the image in order to detect lane markers of a traveling lane and sends the processed image data to controller [3].... " [Column 2, lines 25 - 27].

Further, the claimed determination of whether the host vehicle tends to deviate from the driving lane and executing lane deviation prevention control is disclosed by Satoh as: " ... controller [3] detects a lane keep condition of vehicle [VE]. When vehicle [VE] is approaching the lane marker and will cross the lane marker, that is, when vehicle [VE] tends to deviate the lane, controller [3] operates an alarm ... " [Column 2, lines 25 - 27], and further that: " ... At step [S14] controller [3] calculates a target yaw rate  $\theta_{NEED}$ , which is a yaw rate necessary for reaching the host vehicle from the lateral displacement position to the lane center, on the basis of lateral displacement [XL1] ... " [Column 5, lines 30 - 33]. Thus, it would have been obvious



to one of ordinary skill in the art at the time of the invention to appropriately modify the teachings of Satoh to use a picture image pick-up device to detect the lane line markers and lane deviation of the host vehicle, and to execute lane deviation prevention control.

In regard to Claim 10, the claimed detection of a host vehicle's speed, a host vehicle's yaw angle, a host vehicle's lateral displacement from a central axis, and a curvature of the host vehicle's driving lane is disclosed by Satoh as: "... road parameter 'a' denotes a lateral displacement of vehicle [VE] between the lane markers, 'b' denotes a road curvature, 'c' denotes a yaw angle of vehicle [VE] relative to the road ..." [Column 3, lines 6 - 10], and that: "... At step [S12] controller [3] reads a vehicle speed V from vehicle speed sensor [5] ..." [Column 5, lines 27 - 28]. Further, the claimed future lateral-displacement estimate is disclosed by Satoh as: "... Controller [3] estimates the road shape on the basis of the calculated road parameters and calculates the lateral displacement [XL1] ..." [Column 6, lines 8 - 11]. Further, the claimed host vehicle deviation when the absolute value of the lateral displacement estimate exceeds a predetermined criterion is disclosed by Satoh as: "... further, when the absolute value  $|\Delta\theta|$  becomes larger than threshold  $\theta_{TH}$ , controller [3] determines that there is a possibility that vehicle VE deviates from the traveling lane...." [Column 6, lines 50 - 53]. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to appropriately modify the teachings of Satoh to detect a vehicle's traveling parameters and estimate a future lateral displacement of the vehicle based on these parameters, and check to see if

the estimate exceeds a predetermined threshold value to determine the host vehicle's deviation.

11. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jeon in view of Satoh as applied to Claim 2 above, and further in view of Hiwatashi et al. (US Pat. No.: 6,411,901; hereinafter Hiwatashi).

In regard to Claim 3, the additional claim of using signals from the wheel speed sensors to determine whether the host vehicle is traveling on the predetermined irregularities near lane marking lines of the driving lane is disclosed by Hiwatashi as: " ... The vehicle [1] is further provided with a vehicle speed sensor [4] which detects vehicle speed V. The ADA system [2] is constructed such that the vehicle speed V detected by the vehicle speed sensor [4] and images in a running direction of the own vehicle ... " [Column 3, lines 35 - 40].

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the disclosures of Jeon and that of Satoh (as discussed in the rejection of Claim 2), with the teachings of Hiwatashi to use the wheel speed signals to determine if the host vehicle is traveling on the predetermined irregularities near lane marking lines of the driving lane.

12. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jeon in view of Satoh as applied to Claim 2 above, and further in view of Kinoshita et al. (US Pat. No.: 6,057,754; hereinafter Kinoshita).

In regard to Claim 7, the additional claim of determining whether the host vehicle is traveling within an area except road-ways; and inhibiting a check for the host vehicle is disclosed by Kinoshita as: " ... in the real world, there are cases where drivers are required to negotiate roads crowded with pedestrians or parked vehicles and as a result, drivers often move out of lanes to avoid a contact with those pedestrians or parked vehicles ... ", and that: " ... In order to make this type of an ADA (Active Drive Assist) system more practicable, these drivers' intentional behaviors must be discriminated from inadvertent ones as described above to control or suppress the issuance of alarms... " [Column 1, lines 36 - 44]. Further, Kinoshita discloses: " ... a warning signal generation judging means for outputting a signal to stop or suppress an alarm when the self vehicle moves out from the self lane and at least when it is judged based on the information obtained from the running environment judging section that an object exists on the self lane within a pre-established range and that the object is an obstacle to the self vehicle ... " [Column 3, lines 20 - 26].

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the disclosures of Jeon and that of Satoh (as discussed in the rejection of Claim 2), with the teachings of Kinoshita to determine if the vehicle has moved out of the road-ways, and thereby inhibiting any lane deviation checks for the vehicle.

13. Claims 11, 12, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jeon in view of Satoh as applied to Claims 2 and 8 above, and further in view of Matsuda (US Pat. No.: 6,216,079; hereinafter Matsuda).

In regard to Claim 11, the claimed calculation of a braking/driving force variable, and controlling of the road wheels so that a yaw moment is produced in a direction to avoid the host vehicle's lane-deviation tendency, is disclosed by Matsuda as: " ... a deviation [1] is calculated by comparing the actual motion state of the vehicle with the reference motion state for the vehicle ... " [Column 8, lines 23 - 26], and that: " ... At Step S25, when the sign of the deviation [1] is negative to indicate that the vehicle is in the under-steered state, a braking force is generated in the inner wheels as viewed during turning of the vehicle, in accordance with the operation amount by the vehicle behavior control means [M5], and a yaw moment in the same direction as the steering operation is generated to eliminate the under-steered state. At step S26, when the sign of the deviation [1] is positive to indicate that the vehicle is in the over-steered state, a braking force is generated in the outer wheels as viewed during turning of the vehicle, in accordance with the operation amount (1) by the vehicle behavior control means M5, and a yaw moment in the opposite direction to the steering operation is generated to eliminate the over-steered state ... " [Column 8, lines 61 - 67, and Column 9, lines 1 - 7].

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the disclosures of Jeon and Satoh (as discussed in the rejection of Claims 2 and 8 above), with the teachings of Matsuda to calculate a

braking force to control the road wheels and produce a yaw moment in a direction to avoid the host vehicle's lane-deviation tendency.

In regard to Claim 12, the claimed calculation of a yaw moment based on a difference between the future lateral-displacement estimate and the predetermined lateral-displacement criterion, and the calculation of a corresponding braking/driving force controlled variable for each of the road wheels, is disclosed by Matsuda as: "... the operation amount is corrected in accordance with the deviation resulting from the comparison of the actual direction of the curve and the actual direction of movement of the vehicle V to calculate the operation amount (2) (see FIG. 11), and the braking force for the inner wheels and the driving force for the outer wheels are increased based on the operation amount (2). Therefore, a sufficient yaw moment can be generated in the vehicle V to reliably eliminate the under-steered state ... "[Column 12, lines 1 - 10]. While Matsuda does not explicitly disclose calculation of the host vehicle deviation when the absolute value of the future lateral displacement estimate exceeds a predetermined criterion this is disclosed by Satoh, as discussed in the rejection of Claim 10 above.

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the disclosures of Jeon and Satoh (as discussed in the rejections of Claims 8 and 10 above), with the teachings of Matsuda to calculate a braking/driving force to the road wheels based on the yaw moment calculated from the difference between the future lateral-displacement estimate and the predetermined lateral-displacement criterion.

In regard to Claims 13 and 14, the claimed controlling a braking force of each of road wheels so that a yaw moment (including a constant yaw moment in Claim 14) is produced in a direction in which the host vehicle returns to the central position of the driving lane, is disclosed by Satoh as: "... there is further provided brake actuators [16] for generating braking force to wheels and a brake controller [16a] for operating brake actuators [16] according to a command from controller [3] ..." [Column 8, lines 1 - 5], and that: "... and commands brake controller [16a] to operate brake actuators [16] so as to generate braking force for avoiding vehicle [VE] from deviating from the lane. After the braking force is applied to the wheels by operating brake actuators [16], the routine returns to step [S11] ..." [Column 8, lines 17 - 21]. However, Satoh does not explicitly disclose braking/driving forces, but in an analogous art Matsuda discloses the claimed controlling braking/driving forces of the road wheels, responsively to the braking/driving force controlled variables, as: "... A vehicle behavior control means controls at least one of a driving force and a braking force for the vehicle, based on the operation amount calculated by the operation amount-calculating means ..." [Column 2, lines 14 - 17]. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Satoh with the teachings of Matsuda to control the braking/driving forces to the road wheels, to produce a yaw moment in a direction to return the host vehicle to the central position of the driving lane.

14. Claims 15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jeon in view of Satoh as applied to Claim 2 above, and further in view of Kawazoe et al. (US Pub. No.: 2002/0013647; hereinafter Kawazoe).

In regard to Claim 15, the claimed production of a steering torque in a direction in which the host vehicle returns to the central position of the driving lane is disclosed by Kawazoe as: " ... a lane following vehicle control apparatus for a vehicle, comprises: ... (3) a steering torque producing section to produce an actual steering torque in accordance with a target steering torque to follow the lane; (4) a steering torque controlling section to set the target steering torque required for the controlled vehicle to follow the lane in accordance with the information on the lane ... " [Page 1, Paragraph 9]. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the disclosures of Jeon and Satoh (as discussed in the rejection of Claim 2), with the teachings of Kawazoe to produce a steering torque in a direction in which the host vehicle returns to the central position of the driving lane, when the vehicle is traveling on the predetermined irregularities near a marking line of the driving lane.

In regard to Claim 18, the claimed feedback control of steering torque such that the host vehicle returns to the central position of the driving lane is disclosed by Kawazoe as: " ... to perform operations equivalent to a feedback control system shown in FIG. 4. In the feedback control system of FIG. 4, a subtracter [31] calculates a deviation  $\Delta\theta$  ... " [See Fig. 4, and Page 3, Paragraph 44]. In the discussions for rejecting Claim 15 above, Kawazoe disclosed control of steering

torque to return the host vehicle to a neutral position of the driving lane. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the disclosures of Jeon and Satoh of detecting the host vehicle traveling on the predetermined irregularities close to the lane markers, and return of the host vehicle to the center position (as discussed in the rejection of Claim 2), with the teachings of Kawazoe to feedback control a steering torque so that the host vehicle returns to the central position of the driving lane, when the vehicle is traveling on the predetermined irregularities.

15. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jeon in view of Satoh as applied to Claim 2 above, and further in view of Pilutti et al. (US Pat. No.: 6,021,367; hereinafter Pilutti).

In regard to Claim 17, the claimed feedback control of the braking forces applied to respective road wheels for preventing lane deviation of a host vehicle is disclosed by Pilutti as: "... FIG. 10 shows in schematic form a closed loop circuit for the brake steering lateral error control of our invention. A desired lateral position Y is entered into the control loop as shown at [50]. This input is received at a summing point [52] and is compared to lateral position sensor data from data flow path [54]. An error is determined at [52] and is transferred to a function flow path [56]. The error signal is delivered to PD controller [58], which has a proportional input portion at function flow segment [60] ... " [See Fig. 10, and Column 6, lines 42 - 50]. Thus, Pilutti discloses



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a feedback control of the braking forces in closed loop, to steer and prevent the lateral lane deviation of the vehicle.

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the disclosures of Jeon and Satoh of detecting the host vehicle traveling on the predetermined irregularities close to the lane markers of the driving lane (as discussed in the rejection of Claim 2), with the teachings of Pilutti to feedback control in closed loop the braking forces applied to the road wheels so that the host vehicle returns to the central position of the driving lane, when the vehicle is traveling on the predetermined irregularities.

***Allowable Subject Matter***

16. Claims 4, 5 and 6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In regard to Claims 4 and 5, the prior art of record does not show or reasonably suggest, in combination with the other claimed subject matter, a method for detecting if a host vehicle is traveling on predetermined irregularities near the lane marking lines of a driving lane based on fluctuations of the wheel speeds at a substantially constant time period. It is recommended that Claims 4 and 5 be combined into a single claim, as the inventive concepts are essentially similar in both claims.

In regard to Claim 6, the prior art of record does not show or reasonably suggest, in combination with the other claimed subject matter, a method for detecting if a host vehicle is traveling on predetermined irregularities near the lane marking lines of a driving lane based on detecting an up-and-down motion of the vehicle's suspension.

### ***Conclusion***

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure, as follows:

- Shibahata et al. (US Pat. No.: 6,059,067), discloses feedback control for yaw moment correction for a vehicle.
- Furukawa et al. (US Pat. No.: 6,334,656), discloses using braking forces for the control of yawing moment of a vehicle.
- Sadano et al. (US Pub. No.: 2003/0014162), discloses detecting lane markers and a lane-keep control system to prevent a vehicle from moving out of a travel lane.
- Reeve et al. (US Pat. No.: 4,727,492), discloses a vehicle control and guidance system to correct the position of the vehicle relative to reference points.

The references of Jeon, Satoh et al., Hiwatashi et al., Kinoshita et al., Matsuda, Kawazoe et al. and Pilutti et al. are cited for illustrating various vehicle lane deviation prevention systems that have features and inventive concepts similar to the applicant's "Automotive lane deviation prevention apparatus".

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Santanu Chatterjee, whose telephone no. is 571-272-5890. The examiner can normally be reached on Mon. – Fri., 8am – 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Black can be reached on 571-272-6956. The FAX phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
THOMAS G. BLACK  
SUPERVISORY PATENT EXAMINER  
GROUP 3600

Examiner's Initials: SC

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